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Publication date:
2013

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Christensen, E. G., Licht, T. R., Kristensen, M., & Bahl, M. I. (2013). *Dietary whole-grain wheat increases intestinal levels of bifidobacteria in humans and bifidobacterial abundance is negatively correlated with the effect of fecal water on trans-epithelial resistance in vitro..* Abstract from Cell Symposia, Lisbon, Portugal.

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Dietary whole-grain wheat increases intestinal levels of bifidobacteria in humans and bifidobacterial abundance is negatively correlated with the effect of fecal water on trans-epithelial resistance *in vitro*.

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Consumption of whole grain products are considered to have beneficial effects on human health including decreased risk of cardiovascular disease. However, effects on gut microbial composition have only been studied limitedly. We used quantitative PCR to determine changes in the gut bacterial composition in post-menopausal women following a 12-week energy restricted intervention with whole-grain wheat (WW, n=37) or refined wheat (RW, n=33). The WW intervention significantly increased the relative abundance of *Bifidobacterium*. Caco-2 cells were exposed to fecal water to determine effects of the bacterial community metabolites on the trans-epithelial resistance (TER). Fecal water increased TER independent of diet, indicating that commensal bacteria provide metabolites facilitating an increase in intestinal integrity. TER was unexpectedly found to be negatively correlated to the relative abundance of *Bifidobacterium*. The present study suggests that increase of specific bacterial groups, which are considered beneficial, may in some circumstances increase the permeability of the intestinal wall.

Keywords:

Gut microbiota

Whole-grain wheat

Trans-epithelial resistance

Bifidobacterium